52nd Gaseous Electronics Conference
Old Dominion University, Norfolk, VA
October 5-8, 1999

Abstract of Invited Presentation

Ultralow Energy Electron Attachment at Sub-Millielectron Volt Resolution.

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The technique of rare-gas photoionization [1] has been extended [2] by use of direct laser ionization to electron energies ϵ in the range 0-100 meV, with a resolution $\Delta\epsilon$ of 0.4-0.5 meV (FWHM). Tunable UV light at λ276 nm is produced using a pulsed Nd:YAG laser and nonlinear mixing techniques. The beam is frequency tripled in a pulsed jet of xenon. The VUV radiation, tunable at λ92 nm, is then used to photoionize Xe at its $^2P_{1/2}$ threshold (single-photon ionization). The photoelectrons produced interact with admixed target gas to generate negative ions through the *s*-wave capture process. Recent results in electron attachment to SF_6 will be reported which show resonance structure at the opening of the ground-state vibrational channels [2,3]. This structure corresponds to the process of vibrational excitation + attachment, which is superimposed on the underlying *s*-wave (direct) capture process. It should be a general phenomenon, present in a wide variety of zero-energy electron attaching molecules.

* In collaboration with A. Kortyna, M. R. Darrach and P-T. Howe. This work was carried out at JPL/Caltech, and was supported through the NSF AMOP Program through agreement with NASA.

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